Effect of Nurse led Women Wellness Hub on Risk factors of Non Communicable Diseases among adult women in selected community setting - A Randomised Controlled Trial

Synopsis

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By

Mrs.MADHURIMA.D, M.Sc NURSING

UIN : 1905001019

Under the Guidance of

Dr.Helen Shaji J C

Former Principal

Shri Sathya Sai College of Nursing

Sri Balaji Vidyapeeth University (DU)

Chennai Campus

ABSTRACT

Background

In India, NCDs account for 60% of deaths and 62% of disease prevalence, with women at higher risk due to various factors. The Nurse-led Women Wellness Hub (NLWWH) addresses this by promoting lifestyle changes, including motivational interviewing, nutrition, and yoga, to reduce risk factors like tobacco use, poor diet, and obesity.

Aim:

This study evaluates NLWWH's impact on the risk factors of non communicable diseases among adult women in the selected community settings.

Methods

A Randomized Controlled Trial (RCT) design was used to evaluate the impact of the Nurse-led Women Wellness Hub (NLWWH) on non-communicable disease (NCD) risk factors in women aged 30-59. Conducted in Chennai, the research employs a sample size of 438, divided into study and control groups. Key variables include the NLWWH as the independent variable and NCD risk factors as the dependent variables. Data collection involves a structured tool assessing demographic variables, behavioural, bio physical, physiological, bio chemical risk factors, using WHO STEPS Survey and psychological risk factor includes perceived stress using Perceived stress scale.

Results

The study is found effective in reducing the bio physical, physiological, bio chemical and psychological parameters with the F value 61.37 for BMI, 3.38 for waist circumference, 34.42 for systolic blood pressure, 15.10 for diastolic blood pressure, 26.24 for fasting blood sugar, 27.75 for post prandial blood sugar, 1.9 for total cholesterol and 26.05 for perceived stress. Highly significant at $p<0.001$ thus rejects the hypothesis in study group. No statistical significance was found in control group.

Conclusion

The Nurse Led Women Wellness Hub effectively reduces NCD risk factors in women, supported by participant feedback and statistical analysis. The study recommends improving NCD clinics and dedicating weekly health promotion days, and urges community nurses to create comprehensive wellness centers.

ABBREVATIONS

1. BMI – Body Mass Index
2. DBP – diastolic blood Pressure
3. FBS – Fasting Blood Sugar
4. NCD – Non Communicable Diseases
5. NFHS – National Family Health Survey
6. NLWWH – Nurse Led Women Wellness Hub
7. NS – Non Significant
8. PPBS – Post Prandial Blood Sugar
9. PSS – Perceived Stress Score
10. S – Significant
11. SBP – Systolic Blood Pressure
12. WC – Waist Circumference
13. WHO – World Health Organisation

CHAPTER I

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Non-communicable diseases (NCDs), including cancers, heart disease, and diabetes, are major global health concerns, responsible for 74% of deaths worldwide, totalling 41 million people annually. These diseases are chronic and non-transmissible, with low- and middle-income countries disproportionately affected. These countries experience 86% of premature NCD deaths and 77% of all NCD deaths. Cardiovascular diseases are the leading cause, followed by cancers, chronic respiratory diseases, and diabetes, together accounting for over 80% of premature NCD deaths [1, 2].

In India, NCDs account for 62% of the total burden of disease and 60% of annual deaths. Cardiovascular diseases, chronic respiratory diseases, cancers, and diabetes are the major contributors, with a 26% probability of dying from these NCDs between ages 30 and 70 ([3, 4]. The burden of NCDs in India has increased from 33% to 55%, with diabetes and hypertension being predominant [5].

Globally, NCDs cause 18 million deaths annually among women. In India, the prevalence of NCDs is higher in females compared to males [6,7]. Diabetes is the seventh leading cause of death in women, with significant mortality among those aged 40-60. It is projected that diabetes cases in women will rise to 222 million by 2030 (8). Hypertension contributes significantly to heart disease and affects women's health, increasing morbidity and mortality [9]. Women often experience silent heart attacks, making them less likely to receive early diagnosis compared to men [10].

NCD risk factors include modifiable behaviors and metabolic conditions. Key modifiable risks are tobacco use, unhealthy diet, physical inactivity, and excessive alcohol consumption [11].

The present study introduces a novel nurse-led women's wellness hub to address NCD risk factors among women through various interventions, aiming to reduce the global burden of NCDs on women

1.2 AIM

To evaluate the impact of Nursee led Women Wellness Hub on the Risk Factors of Non Communicbale Diseases among the adult Women.

1.3 OBJECTIVES

1.3.1 PRIMARY OBJECTIVES

- To assess the prevalence of risk factors of non communicable diseases among the participants in study and control group
- To compare the pre and post test mean differences of risk factors of non communicable diseases in study group and control group
- To determine the effect of Nurse Led Women Wellness Hub on risk factors of non communicable diseases in study group and control group
- To associate the post test data with the selected demographic variables of the participants in the study and control group.

1.3.2 SECONDARY OBJECTIVES

- To assess the perceived level of satisfaction in the nurse led women wellness hub among adult women in study group

1.4 OPERATIONAL DEFINITION

Nurse Led Women Wellness Hub: In this study, Nurse Led Women Wellness Hub is a wellness wing attached to the Mini Health Centres run by M.A.Chidambaram Institute of Community Health/Voluntary Health Services, Thuraipakkam, Chennai which addresses the risk factors of non communicable diseases facilitated by a qualified nurse who provides the health promotional activities like Motivational interviewing, Behaviour Change education, Nutritional guidance, Yoga, follow up and referral activities exclusively for adult women.

Motivational interviewing: It is a **discussion for 15 - 20 minutes** to explore the attitude and practices and motivating the appropriate healthy behaviour among the adult women thereby facilitating to bring behavioural change.(expressing positive and negative consequences of risk behaviors; pros and cons of risky lifestyle - physical inactivity, unhealthy diet); identify and discuss reasons for wanting or not wanting to change; discuss perceived consequences of action and inaction)

Behaviour Change Education: It refers to the health education on the non communicable diseases and its prevention with the use of multimedia (video) in which the causes, risk factors of non communicable diseases, complications and preventive measures are explained.

Nutritional Guidance: It refers to the Comprehensive Guidance on healthy diet, intake of salt, oil, fruits and vegetables at right servings through powerpoint visuals and booklet which includes nutritional measurements were shown, calculations of daily requirement of salt and oil for the family and a model menu plan are insisted

Yoga: A live demonstration of yoga postures that aids to regularize the blood pressure, blood glucose and cholesterol levels were done by the researcher. (vajrasanam, halasanam, bujangasanam, dhanurasanam, Pranayama is taught.

Follow up: In this study followup refers to the direct and indirect visits or enquiries made to ensure the practice of healthy behaviours to prevent the non communicable diseases. The follow-up services include the following **Direct -** visiting participants directly at their doorsteps by researcher once in two weeks, multipurpose health workers once in a week, peer members daily. **Indirect follow-up –** It is ensured through the text messages through whatsapp by the researcher

Referral services: It refers to the referring of the participants with health issues to Voluntary Health services, Taramani, Chennai.

Risk Factors of Non Communicable Diseases

In this study, risk factors of non communicable diseases include modifiable risk factors and metabolic risk factors of non communicable diseases like diabetes mellitus, hypertension and cardiovascular diseases as measured by WHO STEPS Format, modified to Indian Context and perceived stress scale.

Modifiable Risk Factors: It includes stress & behavioural factors like physical inactivity, inappropriate dietary pattern, use of alcohol and tobacco

Metabolic Risk Factors: It includes bio physical parameters like increased BMI, & waist circumference, physiological parameters like blood pressure & bio chemical parameters like increased blood glucose, and increased serum cholesterol than the normal range

Perceived Level of Satisfaction (Secondary Objective)

It refers to the quantitative measurement of level of satisfaction experienced by the participants enrolled in the Nurse Led Women Wellness Hub regarding the activities provided by the qualified nurse and the effect on reduction of stress and risk factors of non communicable diseases

Adult Women

In this study, adult women refer to the women between the age group of 30 – 59 years.

Selected community settings

In this study, selected community settings refer to the adopted community areas of M.A.Chidambaram Institute of Community Health/Voluntary Health Services, Thuraipakkam, Chennai

1.5 NULL HYPOTHESIS

NH_{01} - There is no significant difference in risk factors of non communicable diseases among adult women between study group and control group at $P<0.05$

NH_{02} – There is no significant impact of Nurse led Women Wellness hub on risk factors of non communicable diseases in study and control groups at $P<0.05$

NH_{03} - There is no significant association on risk factors of non communicable diseases among adult women with their selected demographic variable at $P<0.05$

1.6 ASSUMPTIONS

- It is assumed that the adult women in the selected community have varying levels of knowledge about non-communicable diseases (NCDs) and their risk factors before participating in the wellness hub program.
- Women participating in the study will actively engage with the Nurse-led Women Wellness Hub and adhere to the interventions and guidance provided.
- The wellness interventions provided by the nurse-led hub will be standardized across participants to ensure consistency in the study's outcomes.

1.7 DELIMITATIONS

- Study was delimited to the adult women with risk factors
- Study was delimited to the risk factors of specific non communicable disease like diabetes, hypertension and cardio vascular diseases.

1.8 CONCEPTUAL FRAMEWORK

The study was designed based on the Pender's Health Promotional Model

CHAPTER II

REVIEW OF LITERATURE

This chapter deals with the various literature reviewed for the study and the details of the literature are described under various sections as follows:

Literature related to prevalence of non communicable diseases among women

The overall prevalence of any NCD was 5.3%, with slightly higher rates in women (5.4%) compared to men (5.2%) in the 20-69 age range.[11] A study of participants aged 20-85 found a high prevalence of diabetes or prediabetes (>50%), hypertension (nearly 40%), dyslipidemia (one-third), and elevated kidney function markers and carotid artery thickness (one-third). These results indicate a higher burden of cardiometabolic disease risk factors compared to other rural populations in Tamil Nadu.[12]

Literature related to prevalence of risk factors of non communicable diseases among women

A study with 3,705 participants using the WHO STEPS Survey tool found that urbanicity was associated with higher smoking rates, body mass index, blood pressure, and low physical activity among men. For women, urbanicity was linked to low physical activity and high body mass index.[13] A cross-sectional study of 247 employees at a healthcare institution identified poor dietary habits, suboptimal blood pressure, and physical inactivity as the most common modifiable risk factors for non-communicable diseases (NCDs).[14] A survey in Kerala of 12,012 adults (aged 18–69) found abdominal obesity higher in women (72.6%) compared to men (39.1%), and higher in urban (67.4%) versus rural (58.6%) residents. Tobacco use was 20.3% and alcohol use 28.9% in men. The prevalence of raised BP was 30.4% and raised FBG 19.2%, with raised BP more common in men (34.6%) than women (28%).[15]

Literature related to strategies to prevent non communicable diseases

Effect of health promotional activities on risk factors of non communicable diseases was proved effective among 400 sample using RCT with 200 samples in each group.[16]

A mixed-methods design was employed to evaluate the effectiveness of SMSs on self-reported perceptions of lifestyle modifications had proved generally satisfactory.[17]

2.5 RESEARCH GAP

- Various studies have been done to find the prevalence of risk factors of NCD but very few global studies & no study in India addressed on the interventions on risk factors of Non Communicable Diseases.
- The literature review also identifies the lack of targeted, community-based interventions specifically addressing women's health through a nurse-led model.

CHAPTER III

METHODOLOGY

3.1 RESEARCH APPROACH: Quantitative Approach

3.2 RESEARCH DESIGN: Randomised Controlled Trial Design

3.3 RESEARCH VARIABLE:

Independent Variable: Nurse led Women Wellness Hub

Dependent Variables: Risk factors of non communicable diseases among adult women

Demographic Variables: Age, Education, Income, Occupation, Marital Status,

Extraneous Variables: Family History of Non Communicable diseases

3.4 STUDY SETTING:

Adopted community areas of M.A.Chidambaram Institute of Community Health/Voluntary Health Services, Thuraipakkam, Chennai (Thuraipakkam, Pallikaranai, Neelangarai & Kottivakam)

3.5 POPULATION

TARGET POPULATION: Adult women between 30 to 59 years

ACCESSIBLE POPULATION: Adult women of age between 30 to 59 years meeting the inclusion criteria

SAMPLE : Adult women of age between 30 to 59 years meeting the inclusion criteria, and available at the time of data collection.

3.6 SAMPLING TECHNIQUE: Probability Simple random sampling

Table 3.1 Sampling technique employed in the study

Allocation of study area	Lot Method	
Selection of study participants after survey	Random Numbers from the list	
Enrollment of Participants in the study	Block Randomization	
	Study Group	Control Group
	Monday, Wednesday, Friday	Tuesday, Thursday, Saturday

3.7 SAMPLE SIZE

The estimated sample size was 450. 225 for study group and 225 for control group.

3.8 SAMPLING CRITERIA

INCLUSION CRITERIA

- Adult women between 30 – 59 years of age
- Adult women with mild to moderate risk factors of non communicable diseases

- Women who are willing to enrol in nurse led women wellness hub
- Women available at the time of data collection

EXCLUSION CRITERIA

- Adult women with severe medical illness
- Adult women with known Non Communicable Diseases under medical treatment
- Adult women who are pregnant and or conceived during the period of study
- Adult women with physically and mentally challenged

WITHDRAW CRITERIA: Participants were allowed to withdraw from the study at any time they feel uncomfortable and could not cooperate for the study.

RESCUE CRITERIA: Not applicable

3.9 DATA COLLECTION TOOL

A structured tool consisting of 4 sections was used in the study. The sections included in the study are as follows.

- Section A: Demographic Variables (along with WHO STEPS Format)
- Section B: WHO STEPS Format (Modified to Indian Context)
- Section C: Perceived Stress Scale Questionnaire
- Section D: SERVQUAL scale (Modified)

SECTION A

Section A consists of a bivariate and multivariate items which includes the demographic variables of the participants,

SECTION B

Section B of the WHO STEPS Survey tool is designed to assess various risk factors among populations. It includes behavioural (tobacco, alcohol habit, inadequate fruit and vegetable intake<350gm, inappropriate salt intake, Physical inactivity), biophysical (BMI, Waist Circumference, Blood pressure) and biochemical parameters (Blood sugar, Serum cholesterol). Permission was obtained from WHO through the mail.

SECTION C

Section C consists of a Perceived Stress Scale, a standardized 5 point likert scale consisting of 10 items. Each item is marked against very often, fairly often, sometimes, almost never and never. Each will be scored as 4,3,2, 1 & 0 respectively. Of the total 10 items item no 3,4, 7& 8 are negative statements which will be marked in reverse. The total score of the tool is 67-100% is High Perceived stress, 34-66% is Moderate stress, 0-33% is considered as Mild Stress/no stress. It is an open tool with predesigned permission from the authors to use the tool.

SECTION D : Section D is the Modified SERVQUAL scale. The scale is the modified version of the SERVQUAL scale meant to find the satisfaction level of the patients. The scale consists of

the 5 components namely, tangibles, reliability, responsiveness, accuracy and empathy. Each component consists of 5,3,3,2 & 2 items respectively. Each item is derived in such a way that the participants could express their satisfaction level under the criteria of very poor, poor, good, very good and excellent; which will be scored as 0, 1, 2, 3, & 4 respectively. The total score is 60. 0-20 is considered as not satisfied, 21- 40 is considered as satisfied and 41- 60 is considered as highly satisfied.

3.10 VALIDITY OF THE TOOL

The study was discussed in the research advisory committee and got approval. The suggestions were incorporated and later sent for validation from the external experts. Content validity was obtained from 2 medical experts, 6 nursing experts, 1 yoga expert and 1 dietician. Suggestions given by the experts were incorporated in the main study.

3.11 RELIABILITY OF THE TOOL

The instruments used in the study is more standardised and widely used in many researches. WHO STEPS Survey tool was designed by WHO and found more reliable. The reliability of the Perceived Stress scale is 0.82 tested using the test – re test method. Modified SERVQUAL scale was reliable found using the test re test method. The reliability score is 0.8.

3.12 PILOT STUDY

Pilot study was conducted in the Sithalapakam village after obtaining the prior permission. Pilot study was done among 50 participants (10% of the main study sample size) during the June 2022 to October 2022. The study was found feasible. Using the tools was found feasible and appropriate.

3.13 DATA COLLECTION PROCEDURE

Data collection for the study commenced in January 2023 and concluded in November 2023. The study focused on adult women aged 30-59 in four areas—Kottivakam, Neelankarai, Pallikaranai, and Turaipakam—under the MAChidamabram Institute of Community Health. Two areas were randomly assigned as study groups and two as control groups using simple random sampling. Health workers received training on the WHO STEPS Survey tool for measuring height, weight, waist circumference, blood pressure, and glucose, and for delivering follow-up messages.

Steps adopted for Data Collection:

1. **Survey:** Health workers surveyed 600 women in each area using the WHO STEPS tool to identify non-communicable disease (NCD) risk factors**. (Study Group** : Thuraipakam and Pallikaranai, **Control group**: Neelangarai and Kottivakam areas were allotted randomly using lot method)

2. **Sample Allocation:** From 840 eligible samples (425 in the study group and 415 in the control group), 300 women from each area were selected randomly using the random numbers from the list and invited to participate. They were scheduled to visit the Nurse Led Women Wellness Hub on designated days. The visit was scheduled using block randomisation: Monday, Wednesday and Friday in the Study group areas and Tuesday, Thursday and Saturday in Control group areas. 225 participants were enrolled in each group in pre test
3. **Intervention:** participants in the **Study group** were provided with the Nurse led interventions in three sittings who were then followed up for 6 months
    - **Pre-Test:** Baseline assessments were conducted including anthropometric measurements, biochemical tests, and stress levels. Participants underwent motivational interviewing to discuss risk behaviors and set goals for change. 225 participants in each group were enrolled. Homogeneity of the groups were ensured with respect to age.
    - Motivational interviewing was given to the participants after the pre test. Schedule for the second visit and the followup book was given to the participants.
    - **Behavioral Change Education:** Education on NCD prevention through multimedia and interactive sessions, focusing on healthy diets and lifestyle changes.
    - **Nutritional Guidance:** Provided detailed dietary recommendations and model meal plans using visual aids and booklets.
    - **Yoga:** Demonstrations of yoga postures aimed at improving cardiovascular and metabolic health were conducted. Participants were given follow-up booklets with yoga routines.

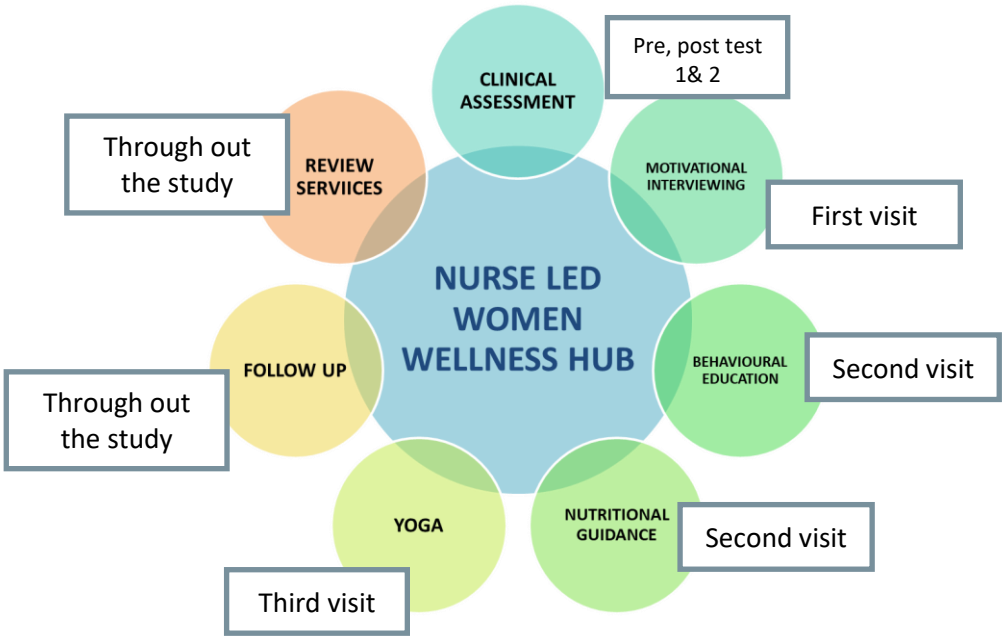


Fig 3.1 Components of Intervention in the Nurse Led Women Wellness Hub

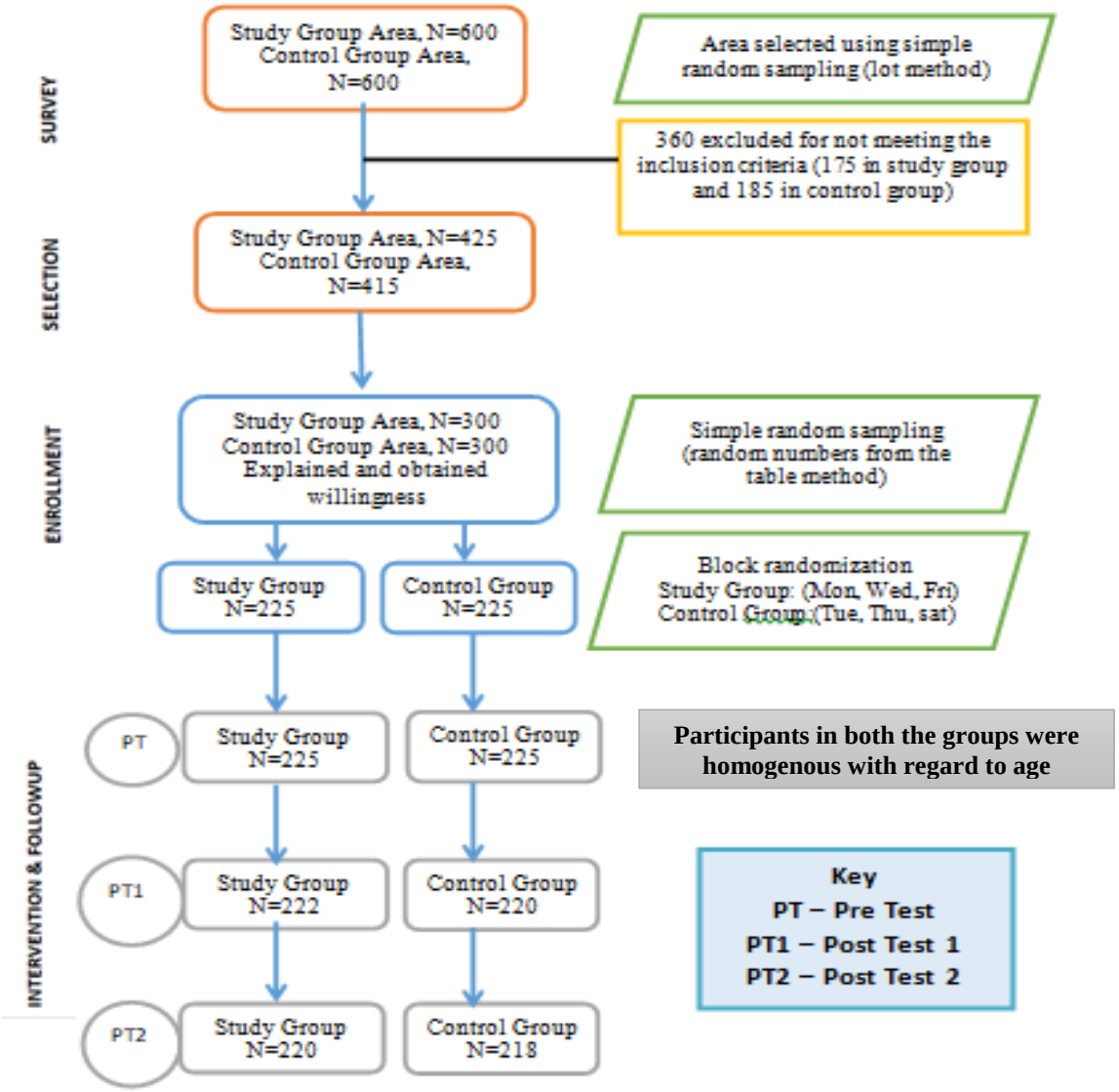
- **Control Group:** Participants continued with regular activities; no additional interventions were applied. They received periodic assessments and educational materials on NCD risk factors after the completion of the study

4. Follow-Up: Participants in the study group were followed-up through direct visits by health workers and indirect methods including WhatsApp messages, covering daily salt intake, fruit and vegetable consumption, yoga practice, and activity levels.

- **Post-Test:**

Post-Test 1: Conducted three months after the intervention in July and August 2023. Number of participants in post test were 222 in study group and 220 in control group

Post-Test 2: Conducted six months after the intervention in October 2023. Number of participants in post test were 220 in study group and 218 in control group


SURVEY
SELECTION
ENROLLMENT
INTERVENTION & FOLLOWUP
Study Group Area, N=600
Control Group Area, N=600
Area selected using simple random sampling (lot method)
360 excluded for not meeting the inclusion criteria (175 in study group and 185 in control group)
Study Group Area, N=425
Control Group Area, N=415
Study Group Area, N=300
Control Group Area, N=300
Explained and obtained willingness
Simple random sampling (random numbers from the table method)
Study Group N=225
Control Group N=225
Block randomization
Study Group: (Mon, Wed, Fri)
Control Group:(Tue, Thu, sat)
PT
Study Group N=225
Control Group N=225
Participants in both the groups were homogenous with regard to age
PT1
Study Group N=222
Control Group N=220
PT2
Study Group N=220
Control Group N=218
Key
PT – Pre Test
PT1 – Post Test 1
PT2 – Post Test 2

Thus the final sample taken for analysis is 438, 220 in study group and 218 in control group

FIG 3.2 Consort Diagram of the Study

3.14 DROP OUT ANALYSIS

Table 3.2 Drop out analysis of the sample

S.No	Content	Study group		Control group	
		n	%	n	%
1	NO OF DROP OUTS	5	2.27	7	3.2

ANALYSIS OF THE DROP OUTS IN FREQUENCY AND PERCENTAGE					
REASONS	**NUMBER**	**%**	**REASONS**	**NUMBER**	**%**
Unable to Contact	2	0.9	Unable to Contact	2	0.9
Migrated	2	0.9	Migrated	3	1.37
Became high risk	1	0.45	Became high risk	2	0.9
Total	**5**	**2.27**	**Total**	**7**	**3.2**

3.15 QUALITY ASSUARANCE OF THE INTERVENTION

Quality of the Intervention was monitored by the medical officer in the mini health centre of M.A.Chidambaram Institute of Community Health/VHS, Thuraipakkam.

Intervention fidelity of the study was done by the medical officer for assuring the quality.

3.16 ETHICAL CONSIDERATION

The study was proposed in various Research Advisory Committee meetings and got revised. The study was also gone scrutinised for ethical concerns in the IEC/Hindu Mission Hospital (HMH/IEC/2021/EA69). The study was also registered and approved by the highest regulatory authority CTRI. (CTRI/2022/04/041896)

Permission was obtained from the MAChidambaram Institute of Community Health/Voluntary Health Services to conduct the study in their adopted health centres.

Participants were informed regarding the purpose of the study. Benefits were explained. Flexibility in withdrawal from the study was also ensured.

Homogeneity was maintained with regard to the age in both the groups

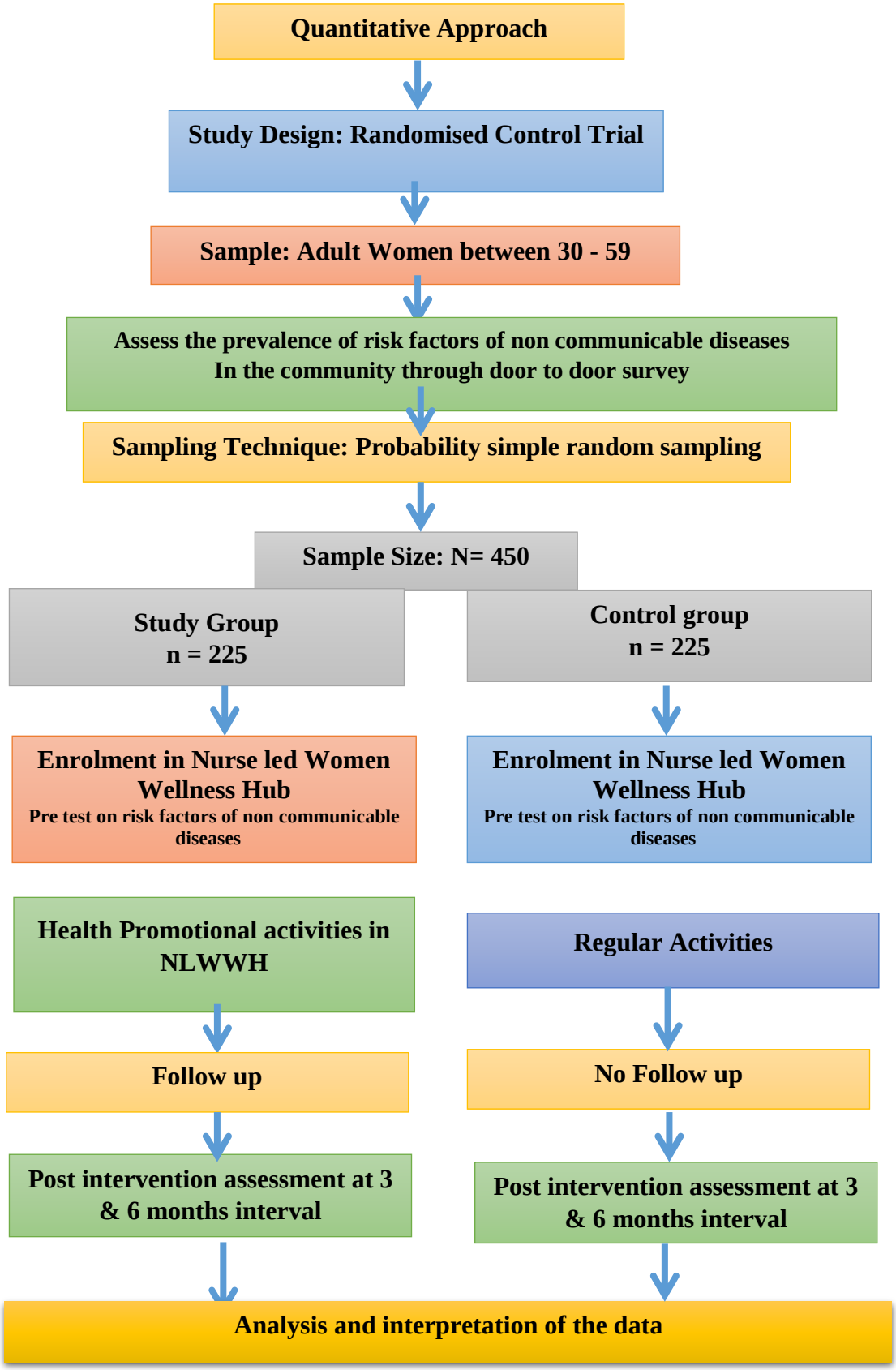

Quantitative Approach
Study Design: Randomised Control Trial
Sample: Adult Women between 30 - 59
Assess the prevalence of risk factors of non communicable diseases
In the community through door to door survey
Sampling Technique: Probability simple random sampling
Sample Size: N= 450
Study Group
n = 225
Control group
n = 225
Enrolment in Nurse led Women Wellness Hub
Pre test on risk factors of non communicable diseases
Enrolment in Nurse led Women Wellness Hub
Pre test on risk factors of non communicable diseases
Health Promotional activities in NLWWH
Regular Activities
Follow up
No Follow up
Post intervention assessment at 3 & 6 months interval
Post intervention assessment at 3 & 6 months interval
Analysis and interpretation of the data

Fig.3.3 Schematic Representation of the Methodology of the Study

CHAPTER IV

DATA ANALYSIS & INTERPRETATION

This chapter deals with the detailed result analysis of the study. The results have been described under various sections based on the objectives.

Section A – Description of the demographic variables of the participants in the study and control group in pre test

Table 4.1 Description of the demographic variables of the participants in the study and control group N=438 (study group 220, control group 218)

Demographic variables		Group				Chi square test
		Study(n=220)		Control(n=218)		
		n	%	n	%	
Age group	30-39 years	74	33.33	71	32.44	$\chi 2=0.79$ p=0.67(NS)
	40-49 years	69	31.56	75	34.23	
	50-59 years	77	35.11	72	33.33	
Level of education	No formal education	17	7.56	10	4.44	$\chi 2=0.35$ p=0.99(NS)
	Primary school	39	18.22	47	21.78	
	High school	97	43.11	80	37.33	
	Secondary school	36	16.44	47	20.44	
	Under graduate	29	12.89	32	14.22	
	Post graduate	2	1.78	2	1.78	
Marital status	Never married	0	0.00	0	0.00	$\chi 2=0.60$ p=0.44(NS)
	Currently married	210	95.56	206	94.67	
	Separated	2	0.89	2	0.89	
	Divorced/	2	0.89	3	1.33	
	Widowed	6	2.67	7	3.11	
Occupational status	Government Employee	0	0.00	0	0.00	$\chi 2=1.36$ p=0.51(NS)
	Non Government employee	17	7.56	33	7.11	
	Self employed	34	15.11	37	17.33	
	Non Paid Student	22	9.78	21	9.33	
	Daily Wage Coolie	11	4.89	14	6.22	
	Home Maker	136	62.67	113	60.00	
Family income	<Rs.5000	0	0.00	0	0.00	$\chi 2=2.96$ p=0.57(NS)
	Rs.5000-Rs.9999	11	4.89	16	7.11	
	Rs.10000-Rs.14999	81	29.78	64	30.22	
	Rs.15000-Rs.19999	65	29.33	36	24.89	
	>Rs.20000	63	36.00	102	37.78	
Family History	No History	125	67.56	151	71.11	$\chi 2=0.67$ p=0.41(NS)
	Presence of DM	95	32.44	67	28.89	
	No History	143	72.44	157	73.78	$\chi 2=0.10$ p=0.75(NS)
	Presence of HT	77	27.56	61	26.22	
	No History	213	98.22	216	98.67	$\chi 2=0.14$ p=0.70(NS)
	Presence of CVD	7	1.78	2	1.33	

NS – Not significant

The table outlines the demographic characteristics of participants in both the study and control groups. Key findings include:

- **Age:** About 35.11% of the study group and 33.33% of the control group were aged 50-59 years.
- **Education:** High school education was completed by 43.11% of the study group and 37.33% of the control group.
- **Marital Status:** Most participants were married, with 95.56% in the study group and 94.67% in the control group.
- **Occupation:** A majority were homemakers (62.67% in the study group and 60% in the control group).
- **Income:** Approximately 36% of the study group and 37.78% of the control group earned above 20,000 INR.
- **Family History:** Diabetes mellitus was present in 32.44% of the study group and 28.89% of the control group; hypertension in 27.56% and 26.22%, respectively. Cardiovascular diseases were rare, affecting 1.78% of the study group and 1.33% of the control group.

Chi-square analysis indicated that there is no significant difference between the groups across these variables.

Section B – Description of the risk factors of non communicable diseases prevailing among the participants in the study and control group in pre test

Table 4.2. Description of the behavioural risk factors among the participants in the study and control group in pre test

N=438 (study group 220, control group 218)

Habits		Group				Chi square test
		Study(n=220)		Control(n=218)		
		N	%	n	%	
Tobacco usage	No	216	98.18	213	97.71	$\chi 2=0.12$ p=0.73(NS)
	Yes	4	1.82	5	2.29	
Alcohol usage	No	218	99.09	214	98.17	$\chi 2=0.70$ p=0.41(NS)
	Yes	2	0.91	4	1.83	
Fruit consumption (>350gm/day)	No	178	80.91	186	85.32	$\chi 2=1.52$ p=0.22(NS)
	Yes	42	19.09	32	14.68	
Vegetable consumption (>350gm/day)	No	215	97.73	209	95.87	$\chi 2=1.22$ p=0.27(NS)
	Yes	5	2.27	9	4.13	
Salt Intake < 5gm /day	No	122	55.45	124	56.88	$\chi 2=0.09$ p=0.76(NS)
	Yes	98	44.55	94	43.12	
Physical activity	>150mts/week	142	64.55	155	71.10	$\chi 2=2.16$ p=0.14(NS)
	<150mts/week	78	35.45	63	28.90	

NS – Not significant

Section B provides an overview of the prevalence of non-communicable disease risk factors among participants in the study and control groups. Key findings from Tables 4.2 include:

- **Behavioural Risk Factors:** The majority of participants in both groups did not use tobacco (98.18% in the study group and 97.71% in the control group) or alcohol (99.09% in the study group and 98.17% in the control group).
- **Dietary Risk Factors:** Inadequate fruit intake was observed in 80.91% of the study group and 85.32% of the control group. Inadequate vegetable intake was seen in 97.73% of the study group and 95.87% of the control group. High salt intake was reported in 55.45% of the study group and 56.88% of the control group.
- **Physical Activity:** A significant portion of participants engaged in more than 150 minutes of physical activity per week, with 64.55% in the study group and 71.10% in the control group.

Table 4.3 Description of the physical & physiological parameters (obesity, waist circumference & Blood pressure) among the participants in study and control group in pre test N=438 (study group 220, control group 218)

Assessments	Level	Group				Chi square
		Study(n=220)		Control(n=218)		
		n	%	n	%	
BMI	Normal	50	22.73	53	24.31	$\chi 2=0.23$ p=0.89(NS)
	Overweight	55	25.00	51	23.39	
	Obese	115	52.27	114	52.29	
Waist Circumference	No Risk	23	10.45	30	13.76	$\chi 2=1.19$ p=0.55(NS)
	Mild Risk	46	20.91	46	21.10	
	Moderate risk	151	68.64	142	65.14	
Blood Pressure	No Risk	83	37.73	87	39.91	$\chi 2=0.49$ p=0.92(NS)
	Mild Risk	67	30.45	60	27.52	
	Moderate risk	44	20.00	45	20.64	
	High risk	26	11.82	26	11.93	

NS – Not significant

Table 4.3 presents the physical and physiological parameters of participants, focusing on obesity, waist circumference, and blood pressure:

- **Obesity:** Approximately 52.27% of participants in the study group and 52.29% in the control group were classified as obese.
- **Waist Circumference:** 68.84% of the study group and 65.14% of the control group had a waist circumference greater than 90 cm, indicating a moderate risk.

- **Blood Pressure:** 30.45% of the study group and 27.52% of the control group were categorized at mild risk. Additionally, 20% of the study group and 20.64% of the control group were at moderate risk for high blood pressure.

Table 4.4 Description of the bio chemical parameters (blood glucose & serum cholesterol) among the participants in study and control group in pre test

N=438 (study group 220, control group 218)

Assessments	Level	Group				Chi square
		Study(n=220)		Control(n=218)		
		N	%	N	%	
Blood glucose	No risk	57	24.54	64	29.36	$\chi 2=0.79$ p=0.85(NS)
	Mild	69	31.36	68	31.19	
	Moderate	80	36.36	74	33.94	
	High	14	6.36	12	5.50	
Serum Cholesterol	No Risk	147	66.82	154	70.64	$\chi 2=1.60$ p=0.21(NS)
	At risk	73	33.18	64	29.36	

NS – Not significant

The table details the biochemical parameters of participants in both the study and control groups:

- **Blood Sugar level:** Approximately 36.36% of participants in the study group and 33.94% in the control group were categorized as moderate risk.
- **Serum Cholesterol Levels:** About 66.82% of participants in the study group and 70.64% in the control group were classified in the no risk category for serum cholesterol.

Table 4.5 Description of the psychological parameters (level of stress) among the participants in study and control group in pre test

N=438 (study group 220, control group 218)

Assessments		Group				Chi square
		Study(n=220)		Control(n=218)		
	Level of stress	N	%	N	%	
Level of stress	No stress	17	7.73	13	5.96	$\chi 2=0.77$ p=0.68(NS)
	Mild stress	115	52.27	121	55.50	
	Moderate stress	88	40.00	84	38.53	

NS – Not significant

Table 4.5 discusses the psychological parameter of stress levels among participants:

- **Stress Levels:** Approximately 52.27% of participants in the study group and 55.50% in the control group were categorized as experiencing mild stress.

Section C – Comparison of the presence of risk factors of non-communicable diseases among the participants before and after the intervention in study group and control group

Table 4.6: Comparison of behavioral parameters between study and control group in pre test, post test 1 and post test 2

N=438 (study group 220, control group 218)

Risk Parameters			Group				Chi square test
			Study(n=220)		Control(n=218)		
			N	%	n	%	
Tobacco usage	Pre test	No risk	216	98.18	213	97.71	$\chi2$=0.12 p=0.73(NS)
		Risk	4	1.82	5	2.29	
	Post test 1	No risk	218	99.09	213	97.71	$\chi2$=1.33 p=0.24(NS)
		Risk	2	0.91	5	2.29	
	Post test 2	No risk	220	100.00	214	98.17	$\chi2$=2.29 p=0.12(NS)
		Risk	0	0.00	4	1.83	
Alcohol usage	Pre test	No risk	218	99.09	215	98.62	$\chi2$=0.21 p=0.65(NS)
		Risk	2	0.91	3	1.38	
	Post test 1	No risk	220	100.00	215	98.62	$\chi2$=3.04 p=0.08(NS)
		Risk	0	0.00	3	1.38	
	Post test 2	No risk	220	100.00	215	98.62	$\chi2$=3.04 p=0.08(NS)
		Risk	0	0.00	3	1.38	
Fruit Intake <350 gm/day	Pre test	No risk	58	26.36	60	27.52	$\chi2$=0.08 p=0.79(NS)
		Risk	162	73.64	158	72.48	
	Post test 1	No risk	94	42.73	77	35.32	$\chi2$=2.52 p=0.11(NS)
		Risk	126	57.27	141	64.68	
	Post test 2	No risk	128	58.18	80	36.70	**$\chi2$=20.26**
		Risk	92	41.82	138	63.30	**p=0.001***(S)**
Vegetable Intake < 350 gm/day	Pre test	No risk	85	38.64	82	37.61	$\chi2$=0.05 p=0.83(NS)
		Risk	135	61.36	136	62.39	
	Post test 1	No risk	110	50.00	89	40.83	$\chi2$=3.71 p=0.06(NS)
		Risk	110	50.00	129	59.17	
	Post test 2	No risk	134	60.91	99	45.41	**$\chi2$=10.56 p=0.01***(S)**
		Risk	86	39.09	119	54.59	
Salt Intake <5 gm/day	Pre test	No risk	98	44.55	94	43.12	$\chi2$=0.09 p=0.76(NS)
		Risk	122	55.45	124	56.88	
	Post test 1	No risk	118	53.64	95	43.58	**$\chi2$=4.43 p=0.05*(S)**
		Risk	102	46.36	123	56.42	
	Post test 2	No risk	149	67.73	103	47.25	**$\chi2$=18.79**
		Risk	71	32.27	115	52.75	**p=0.001***(S)**
Physical activity <150mts/week	Pre test	No risk	51	23.18	42	19.27	$\chi2$=1.00 p=0.33(NS)
		Risk	169	76.82	176	80.73	
	Post test 1	No risk	86	39.09	50	22.94	$\chi2$=13.33
		Risk	134	60.91	168	77.06	p=0.001***(S)
	Post test 2	No risk	128	58.18	58	26.61	**$\chi2$=44.68**
		Risk	92	41.82	160	73.39	**p=0.001***(S)**

S-Significant, NS – Not significant

Section C evaluates the impact of the intervention on risk factors for non-communicable diseases by comparing pre-test and post-test data in both study and control groups. Table 4.6 compares mean scores for biophysical, physiological, biochemical, and psychological parameters using independent t-tests.

- **Behavioral Risk Factors:** Tobacco usage decreased from 1.82% and 2.29% in pre-tests to 0.91% and 0% in post-tests for the study and control groups, respectively. Alcohol consumption in the study group also dropped from 0.9% and 1.38% in pre-tests to 0% in post-tests, while the control group showed no significant change.
- **Fruit Intake:** Insufficient fruit consumption decreased in the study group from 73.64% in pre-test to 57.27% in post-test 1 and 41.82% in post-test 2. The control group had less improvement, with 64.68% and 63.30% in post-tests 1 and 2.
- **Vegetable Intake:** The percentage of participants with inadequate vegetable intake in the study group dropped from 61.36% in pre-test to 50% in post-test 1 and 39.09% in post-test 2. In the control group, the figures were 59.17% and 54.59% in post-tests 1 and 2.
- **Salt Intake:** The proportion of participants with high salt intake in the study group decreased from 55.45% in pre-test to 46.36% in post-test 1 and 32.27% in post-test 2. In the control group, 56.88% had high salt intake in pre-test, which reduced slightly to 56.42% and 52.75% in post-tests 1 and 2.
- **Physical Activity:** In the study group, those meeting the recommended physical activity level decreased from 76.82% in pre-test to 60.91% in post-test 1 and 41.82% in post-test 2. Conversely, the control group had 80.73% with inadequate physical activity in pre-test, decreasing to 77.06% and 73.39% in post-tests 1 and 2.

The below mentioned Line Graphs Fig 4.1 – Fig 4.8) describes the mean score of the risk parameters between study and control group in pre test, post test 1 and post test 2.

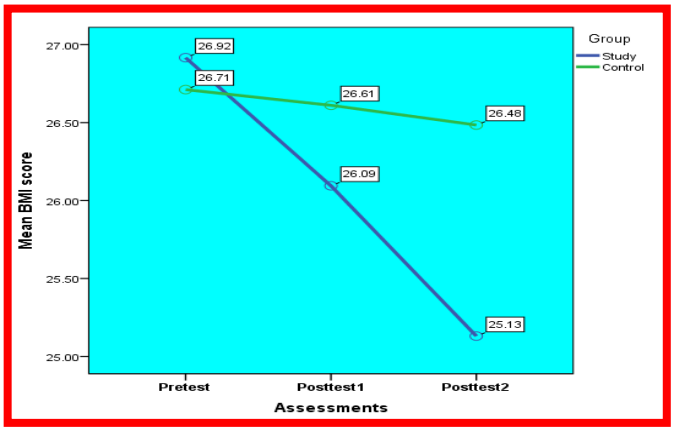


Fig 4.1 Comparison of mean BMI scores between the groups in pre test, post test 1 & 2

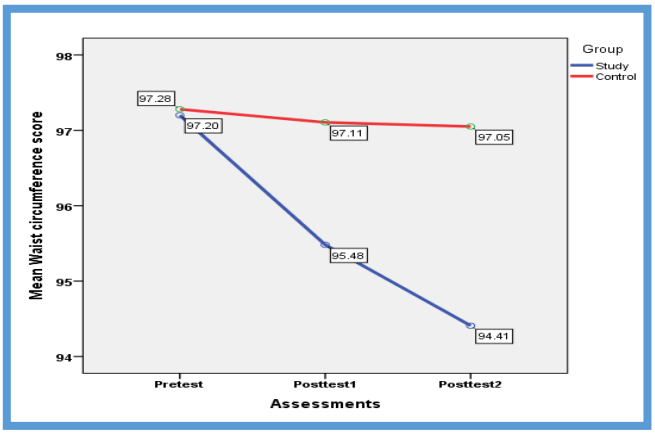


Fig 4.2 Comparison of mean Waist Circumference scores between the groups in pre test, post test 1 & 2

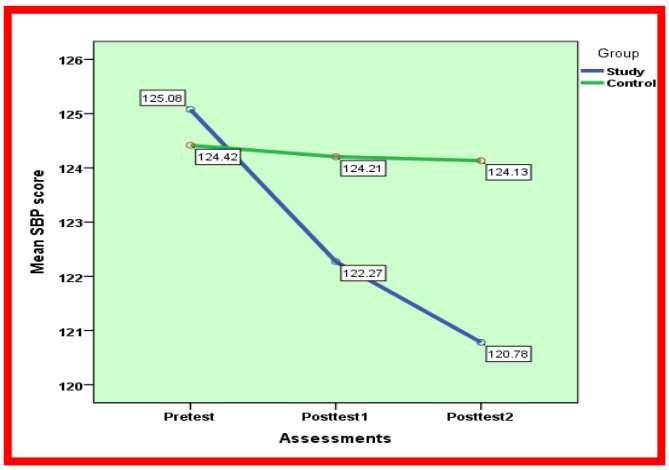


Fig 4.3 Comparison of mean systolic blood pressure scores between the groups in pre test, poste test 1 & 2

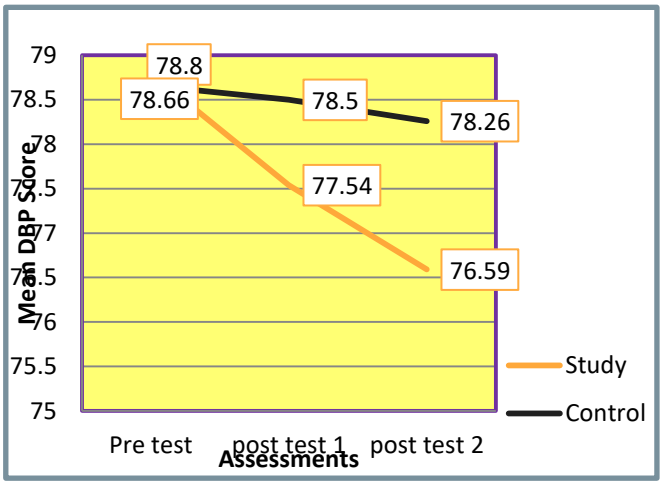


Fig 4.4 Comparison of mean diastolic blood pressure scores between the groups in pre test, poste test 1 & 2

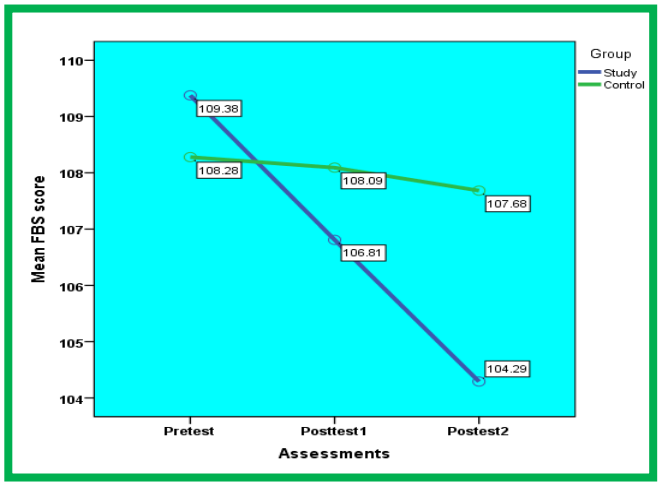


Fig 4.5 Comparison of mean Fasting Blood sugar scores between the groups in pre test, poste test 1 & 2

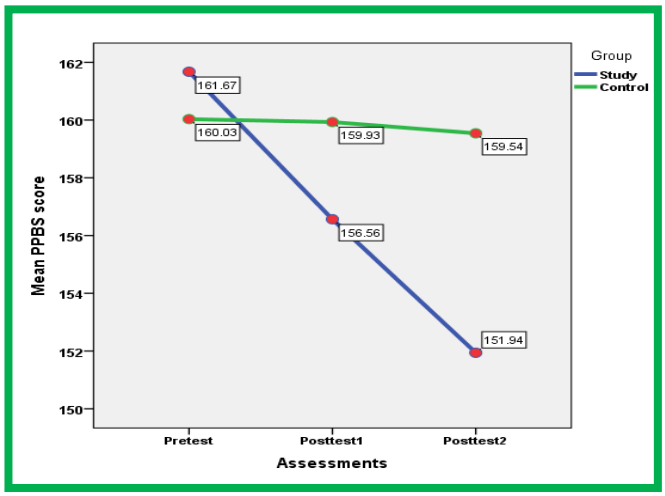


Fig 4.6 Comparison of mean Post prandial Blood sugar scores between the groups in pre test, poste test 1 & 2

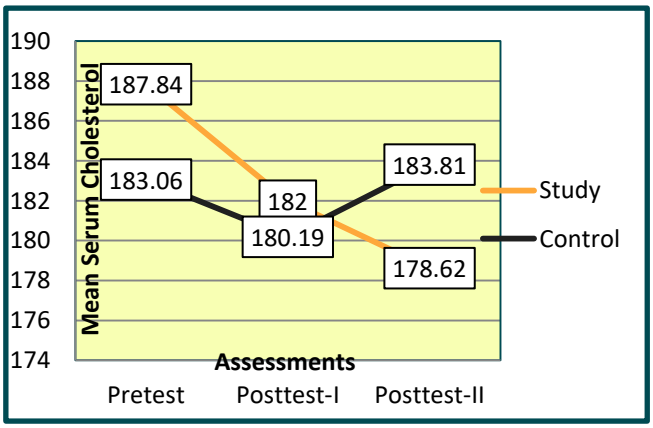


Fig 4.7 Comparison of mean serum cholesterol between the groups in pre test, poste test 1 & 2

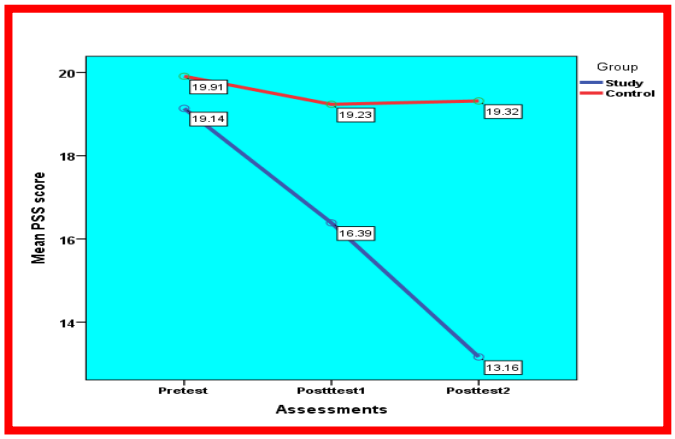


Fig 4.8 Comparison of mean PSS between the groups in pre test, poste test 1 & 2

Table 4.7 Description of mean scores of the biophysical, bio chemical parameters in pre test, post test 1 & post test 2 and the statistical testing student independent t test between study and control group

Null Hypothesis framed is NH_0 - There is no significant differences in risk factors of non communicable diseases among adult women between study group and control group at P<0.05

Assessment		Group				Mean difference	Student independent t-test
		Study		Control			
		Mean	SD	Mean	SD		
BMI	Pretest	26.92	4.37	26.71	4.67	0.21	t=0.47p=0.64(NS)
	Posttest1	26.09	4.42	26.61	4.12	-0.52	t=1.26p=0.20(NS)
	Posttest2	25.13	3.98	26.48	4.16	-1.35	t=**3.48=0.001***(S**)
Waist Circumference	Pretest	97.20	7.91	97.28	9.05	-0.08	t=0.09p=0.92(NS)
	Posttest1	95.25	9.29	97.11	9.13	-1.86	**t=2.11p=0.03*(S)**
	Posttest2	94.42	7.92	97.05	9.03	-2.63	**t=3.24=0.001*(S)**
SBP	Pretest	125.08	16.29	124.42	14.97	0.66	t=0.44p=0.66(NS)
	Posttest1	122.27	14.79	124.21	14.90	-1.94	t=1.36p=0.17(NS)
	Posttest2	120.78	13.19	124.13	14.89	-3.35	**t=2.49p=0.02*(S)**
DBP	Pretest	78.91	9.33	78.66	10.76	0.25	t=0.26p=0.79(NS)
	Posttest1	77.54	8.91	78.50	11.04	-0.96	t=1.00p=0.32(NS)
	Posttest2	76.38	8.69	78.26	11.04	-1.88	**t=1.99p=0.05*(S)**
FBS	Pretest	109.38	16.89	108.28	16.08	1.10	t=0.70p=0.48(NS)
	Posttest1	106.81	15.89	108.09	14.97	-1.28	t=0.04p=0.97(NS)
	Posttest2	104.29	15.76	107.68	14.93	-3.39	**t=2.31p=0.02*(S)**
PPBS	Pretest	161.67	32.91	160.03	31.13	1.64	t=0.54p=0.59(NS)
	Posttest1	156.56	28.52	159.93	28.52	-3.37	t=1.23p=0.22(NS)
	Posttest2	151.94	26.46	159.54	27.98	-7.60	**t=2.92p=0.01**(S)**
TC	Pretest	185.06	34.16	184.14	26.54	0.92	t=0.24p=0.81(NS)
	Posttest1	181.37	27.34	183.67	31.11	-2.30	t=1.74p=0.09(NS)
	Posttest2	177.73	24.85	183.44	30.41	-5.71	t=1.74p=0.09(NS)
PSS	Pretest	19.14	5.33	19.91	4.85	-0.77	t=1.58p=0.11(NS)
	Posttest1	16.39	5.66	19.23	5.74	-2.84	**t=5.21p=0.0001*(S)**
	Posttest2	13.16	4.44	19.32	5.71	-6.16	**t=12.61p=0.0001*(S**

NS – Non significant, S Significant P<0.05

The above table describes the mean scores of the risk parameters and the testing of hypothesis using student independent t test. It shows that it **rejects the null hypothesis in study group** for all the risk parameters, thus stating that there exists a significant difference in the biophysical, bio chemical and psychological parameters between the study and control group at P<0.05

Section D - Effectiveness of Nurse led Women Wellness Hub on the risk factors of non communicable diseases among the participants in study and control group

Table 4.8: Description of the mean differences between the pre test, post test 1 & post test 2 in study and control group and the statistical testing using one way repeated measures ANOVA F test.

NH_0 - There is no significant impact of Nurse led Women Wellness hub on risk factors of non communicable diseases in study and control groups at P<0.05

		Pre-test		Post test-I		Post test-II		Mean difference	One way Repeated measures ANOVA F-test
		Mean	SD	Mean	SD	Mean	SD		
BMI	**Study**	26.92	4.37	26.09	4.42	25.13	3.98	1.79	**F=61.37 p=0.001*** (S)**
	Control	26.71	4.67	26.61	4.12	26.48	4.16	0.23	F=0.68 p=0.51 (NS)
Waist Circumf.	**Study**	97.20	7.91	95.25	9.29	94.42	7.92	2.78	**F=3.38 p=0.05* (S)**
	Control	97.28	9.05	97.11	9.13	97.05	9.03	0.23	F=0.59 p=0.55 (NS)
SBP	**Study**	125.08	16.29	122.27	14.79	120.78	13.19	4.30	**F=34.42 p=0.001*** (S)**
	Control	124.42	14.97	124.21	14.90	124.13	14.89	0.29	F=1.28 p=0.27 (NS)
DBP	**Study**	78.91	9.33	77.54	8.91	76.38	8.69	2.53	**F=15.10 p=0.001*** (S)**
	Control	78.66	10.76	78.50	11.04	78.26	11.04	0.40	F=0.84 p=0.43 (NS)
FBS	**Study**	109.38	16.89	106.81	15.89	104.29	15.76	5.09	**F=26.24 p=0.001*** (S)**
	Control	108.28	16.08	108.09	14.97	108.09	14.97	0.19	F=0.95 p=0.38 (NS)
PPBS	**Study**	161.67	32.91	156.56	28.52	151.94	26.46	9.73	**F=27.75 p=0.001*** (S)**
	Control	160.03	31.13	159.93	28.52	159.54	27.98	0.49	F=0.82 p=0.41 (NS)
TC	**Study**	185.06	34.16	181.37	27.34	177.73	24.85	7.33	**F=1.9 P=0.001*** (S)**
	Control	184.14	26.54	183.67	31.11	183.44	30.41	0.7	F=0.76 p=0.45 (NS)
PSS	**Study**	19.14	5.33	16.39	5.66	13.16	4.44	5.98	**F=276.05 p=0.001*** (S)**
	Control	19.91	4.85	19.23	5.74	19.32	5.71	0.59	F=1.02 p=0.40 (NS)

Table 4.8 details the results of a one-way ANOVA test assessing the effectiveness of the Nurse Led Women Wellness Hub on various health parameters.

In the study group, significant differences were found between pre-test and post-test II measurements across several health parameters. Body Mass Index (BMI) showed a notable change ($F = 61.37$, $p \leq 0.05$), along with Waist Circumference ($F = 3.35$, $p \leq 0.05$). Blood pressure was also significantly impacted, with Systolic Blood Pressure ($F = 34.42$, $p \leq 0.05$) and Diastolic Blood Pressure ($F = 15.10$, $p \leq 0.001$) showing marked improvements. Additionally, there were significant reductions in Fasting Blood Glucose ($F = 26.24$, $p \leq 0.001$) and Post-Prandial Blood Sugar ($F = 27.75$, $p \leq 0.001$). Total Serum Cholesterol also showed a meaningful decrease ($F = 1.9$, $p \leq 0.001$), and participants reported a substantial reduction in Perceived Stress ($F = 276.05$, $p \leq 0.001$).

These findings highlight the effectiveness of the intervention in improving both physical health markers and stress levels. These results indicate significant improvements in all assessed parameters, demonstrating the effectiveness of the intervention. **Thus the null hypothesis is rejected**. Hence it shows that there exists a significant effect of nurse led women wellness hub on the risk factors of non communicable diseases in study group.

Control Group: No statistically significant differences were found between pre-test and post-test Body Mass Index (BMI) remained relatively unchanged ($F = 0.68$, $p \geq 0.05$), as did Waist Circumference ($F = 0.59$, $p \geq 0.05$). Both Systolic Blood Pressure ($F = 1.28$, $p \geq 0.05$) and Diastolic Blood Pressure ($F = 0.84$, $p \geq 0.05$) showed no significant changes. Similarly, Fasting Blood Glucose ($F = 0.95$, $p \geq 0.05$) and Post-Prandial Blood Sugar ($F = 0.82$, $p \geq 0.05$) did not exhibit any significant alterations. Total Serum Cholesterol ($F = 0.76$, $p \geq 0.05$) and Perceived Stress levels ($F = 1.02$, $p \geq 0.05$) also remained stable, indicating no significant impact of the intervention on these variables. This indicates no significant changes in these parameters for the control group. Thus the null hypothesis is accepted at $p<0.05$.

Section E – Association of the risk factors of non communicable diseases in the post test with the selected demographic variables of the participants in the study and control group.

- Age & level of education is associated with inadequate fruit and vegetable intake
- Family history of hypertension & Diabetes is associated with inappropriate salt intake
- Age & family history of diabetes is associated with physical inactivity
- Age & Family history of hypertension is associated with BMI and blood pressure
- Occupation & Family history of diabetes is associated with waist circumference
- Level of education & Occupation is associated with blood glucose
- Age & Level of Education is associated with the stress level

Section F – Perceived level of Satisfaction among the participants in the study group

Table 4.9: Level of satisfaction among the participants in the study group

Level of Satisfaction	Study(n=220)	
	Number of women	Percentage %
Not satisfied	0	0.00
Satisfied	72	32.7
Highly satisfied	148	67.28
Total	220	100.00

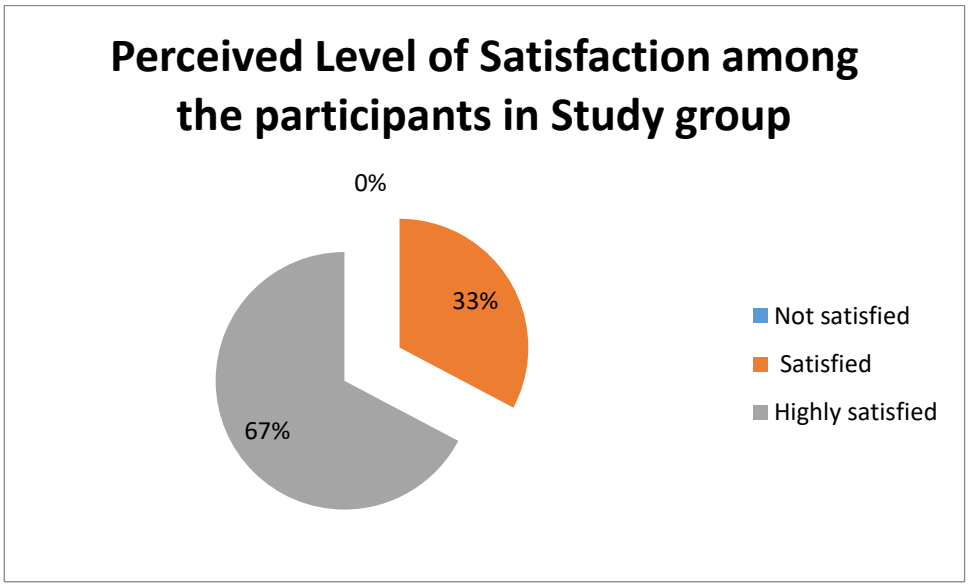


Fig 4.9 Perceive level of Satisfaction among the participants in Study group

CHAPTER 5

DISCUSSION

The chapter deals with the discussion of the present study results with the similar studies done accordingly to the objectives.

5.1 Objective 1:

To assess the prevalence of risk factors of non communicable diseases among adult women in the selected community setting

The study's findings indicate the following prevalence of risk factors among participants:

In the study group, 1.82% of the study group and 2.29% of the control group had an alcohol habit, while 0.91% and 1.83%, respectively, used tobacco. Dietary habits showed that 73.64% of the study group and 72.47% of the control group had inadequate fruit intake, 61.36% and 62.23% had inadequate vegetable intake, and 55.45% and 56.88% had inappropriate salt intake. Physical inactivity affected 76.81% of the study group and 80.73% of the control group. Obesity rates were 52.27% for the study group and 52.29% for the control group. Waist circumference showed mild risk for 20.91% (study) and 21.1% (control) and moderate risk for 68.64% (study) and 65.14% (control). Blood pressure risk was mild in 30.45% (study) and 27.52% (control), with moderate risk for 20% (study) and 20.64% (control). Blood glucose showed moderate risk for 36.36% (study) and 33.94% (control). Total cholesterol risk was higher in 33.18% (study) versus 29.36% (control). Stress levels revealed light risk in 52.27% (study) and 55.5% (control), with moderate risk in 40% (study) and 38.53% (control).

The present study results were supported by the similar study done by **Bhar.D et.al** which has found that the current tobacco use at 69.8% and alcohol use at 40.7%. Additionally, 96.5% had an unhealthy diet and 2.9% were physically inactive, with 11% not meeting WHO physical activity guidelines. Abdominal obesity and overweight rates were 26.2% and 12.2%, respectively [(15).] In contrast, another study done by **Doddamani et.al** noted that 80.3% had used alcohol and 59.5% experienced extreme stress [(18)], likely due to higher stress in fisherman populations. Other study by **Sharma.M et.al** reported higher abdominal obesity (72.6%), daily salt intake of 6.7g, elevated fasting blood glucose (19.2%), and blood pressure (30.4%) [(16).] **Thakur.J et.al** showed diabetes and hypertension rates were 15.5% and 26.2%, respectively, with 91.3% consuming excess salt [(19).] **Kundu MK et.al** observed that the behavioral risks included smoking (9%), drinking (2%), inadequate

fruit and vegetable intake (61%), and insufficient exercise (39%). In Haryana, India, 91.3% had high salt intake and 35.2% were overweight or obese [20].

5.2 Objective 2:

To compare the pre and post test differences of risk factors of non communicable diseases in study group and control group

The present study results showed that in the study group, tobacco use decreased from 1.82% in the pre-test to 0.91% and 0% in post-tests. Alcohol intake similarly fell from 0.9% to 0% in the post-tests. Fruit consumption improved, where the risk dropping from 73.64% to 41.82%, and the risk of vegetable intake decreased from 61.36% to 39.09%. The proportion of participants with inappropriate salt intake fell from 55.45% to 32.27%, and physical activity levels showed improvement, with those.

The results were supported by the study done by **Chudowolska M et.al** in which there was significant decrease in the risk factors. The study showed that the level of physical activity as per the recommendations of WHO has increased among the subjects in the study group (n = 86) in comparison to the control group (n = 78), measured as the daily step counts 10,648 vs. 3589 , $p < 0.0001$[21]

5.3 Objective 3:

To determine the effect of Nurse Led Women Wellness Hub on risk factors of non communicable diseases in study group and control group

The results of the present study showed significant effectiveness in reducing biophysical, physiological, biochemical, and psychological parameters, with F values of 61.37 for BMI, 3.38 for waist circumference, 34.42 for systolic blood pressure, 15.10 for diastolic blood pressure, 26.24 for fasting blood glucose, 27.75 for postprandial blood sugar, 1.9 for total cholesterol, and 26.05 for perceived stress. All results were highly significant at $p < 0.001$, leading to the rejection of the hypothesis. No significant changes were observed in the control group.

The results were supported by a health education-based conventional treatment done by **Mondal R et.al.,** showed significant improvements in risk factors, including a reduction in daily tobacco consumption (11.1±5.9 to 7.4±2.9; P=0.016) and smokeless tobacco use (6.7±3.6 to 4.3±1.7; P=0.005), increased fruit and vegetable intake (3.3±0.8 to 4.9±1.1; P=0.046), decreased salt intake (1.2±0.5 to 0.8±0.5 teaspoon; P<0.001), and increased weekly physical activity. Except for tobacco use, all risk factors decreased [17].

5.4 Objective 4:

The present study showed an insufficient fruit and vegetable consumption is linked to age and education. Excessive salt consumption is associated with a family history of diabetes and hypertension. Inactivity correlates with age and a family history of diabetes. Blood pressure and BMI are related to age, hypertension, and family history of diabetes. Blood glucose levels correlate with occupation and education, while stress is related to age and education.

One of the similar studies conducted by **Yaya et.al,** have showed that the presence of risk factors like Smoking, overweight, obesity, and hypertension are significantly associated with age, education, province, wealth index, and ethnicity. Risk factors are more common in women aged 40-49 (ARR =2.95) and those who are widow/separated (ARR =3.09). Secondary and primary education levels are linked to a higher likelihood of reporting high blood pressure (aOR = 1.53 and 1.48, respectively), but no strong link was found between education and diabetes [(22)].

Another study done by **Dahal et.al** in Nepal, showed that individuals aged 30-44 and 45-59, and those in marital unions, are more likely to be overweight or obese (AOR: 5.15 and 3.39). Older adults are also more likely to have elevated blood pressure (AOR: 6.91) [(23).]

Thus the findings of the present study under the objectives are evident and clearly supported by the similar such intellectual work done across the globe.

CHAPTER 6

SUMMARY, CONCLUSION, RECOMMENDATIONS & LIMITATIONS

6.1 SUMMARY

The study's findings indicate the following prevalence of risk factors among participants:

- 1.82% in study group and 2.29% in control group were having habit of alcohol
- 0.91% & 1.83% in study and control group respectively have habit of tobacco usage
- 73.64% in study group & 72.47% in control group have inadequate fruit intake
- 61.36% in study group & 62.23% in control group have inadequate Vegetable intake
- 55.45% in study group & 56.88% in control group have inappropriate salt intake
- 76.81% in study group & 80.73% in control group are physically inactive
- 52.27% obese in Study group & 52.29% obese in Control group
- **Waist Circumference**: 20.91% Mild risk, 68.64% Moderate risk in study group, 21.1% mild risk, 65.14% Moderate risk in control group
- **Blood pressure:** 30.45% Mild risk, 20%, Moderate, 11.82% high risk in study group, 27.52%, 20.64%, 11.93% in control group
- **Blood Glucose:** 31.36%, 36.36%, 6.36% in study group, 31.19%, 33.94%, 5.3% were mild, moderate & high risk respectively in control group
- **Total Cholesterol**: 33.18% in study group & 29.36 in control group were at risk
- **Level of stress:** 52.27% mild risk, 40% moderate risk in study group, 55.5%, 38.53% in control group
- In the study group, tobacco use dropped from 1.82% in the pre-test to 0.91% and 0% in post-tests 2. Alcohol consumption fell from 0.9% to 0% in the post-tests.
- Fruit intake improved, decreasing from 73.64% to 41.82%.
- Vegetable intake also increased, dropping from 61.36% to 39.09%.
- Inappropriate Salt intake decreased from 55.45% to 32.27%
- Physical activity levels improved, with those meeting recommendations decreasing from 76.82% to 41.82%.
- In the study group, blood pressure decreased from the mean SBP of 125.08 to 120.78 across post-tests, while the control group saw a smaller decrease from 124.42 to 124.13
- similarly, blood glucose risk decreased from 109.38 to 104.2. The control group had 108.28 in pre test to 107.68 in post-tests 2.
- Serum cholesterol risk in the study group dropped from 187.84 to 178.62 post-intervention, while the control group saw a decrease from 183.06 to 183.81

- Perceived Stress risk decreased from 33.18% to 20% post-tests, while moderate stress in controls was stable.
- The study is found effective in reducing the bio physical, physiological, bio chemical and psychological parameters with the F value 61.37 for BMI, 3.38 for waist circumference, 34.42 for systolic blood pressure, 15.10 for diastolic blood pressure, 26.24 for fasting blood sugar, 27.75 for post prandial blood sugar, 1.9 for total cholesterol and 26.05 for perceived stress. Highly significant at $p<0.001$ thus rejects the hypothesis in study group. Whereas no statistical significance was found in control group.

6.2 CONCLUSION

Nurse Led Women Wellness Hub is an attempt to address the risk factors for selected NCD among adult women. The implementation of the NLWWH is found to be more effective to reduce the behavioural, bio physical and bio chemical risk factors of NCD. The study recommends the initiation of upgradation of NCD clinic or allocation of a day in a week for the health promotional activities of the women at risk of NCD in all the health centres. The study also strongly recommends the community nurses to initiate the women wellness centres with the inclusion of all the possible NCD for women inorder to provide the preventive and health promotional activities.

6.3 STRENGTHS OF THE STUDY

- Randomised Controlled Trial, Registered under CTRI
- Study and control groups were selected randomly avoiding the contamination of interventional information between the groups.
- A well planned intervention for 6 months based on the health promotional model and robust review of literature
- A planned and organised follow up by the researcher, health care workers and the peer participants.

6.4 LIMITATIONS OF THE STUDY

- As the study focusses on the women alone, generasibility to gender is not possible
- Behavioural parameters assessed in the study was based on the subjective data of the participants
- Serum Total Cholesterol alone was found to find the cardiovascular risk factors because of the financial constraints. Instead total lipid profile might have brought the complete insight of the CVD risk, Similarly HbA1C might be helpful to find the blood glucose risk.

- Since the study was done in the community and the participants need to be informed regarding the interventions to be carried out blinding was not applied.

6.5 RECOMMENDATIONS OF THE STUDY

Policy Makers

- Each area under the centres can be scheduled in a month concentrating the targeted women for their health promotional activities
- The other common diseases of women can also be concentrated as a part of the centre. The activities can include under the concept of RMNCHA+N as RMNWCHA+N

Institutions

- Can initiate and develop a value added course/certification course to the students to enhance the knowledge and skills in women's health and management of health issues of women

Individual/Independent Nurses

- Qualified Nurses can adopt the study and start the individual nurse led centres for women's health in the urban and rural areas.

6.6 IMPLICATIONS OF THE STUDY

Nursing Administration

- The concept of NLWWH can be promoted and recommended to the policy makers and the Universities for the benefit of the community people

Nursing Education

- Certificate programme on School health Nursing can be enriched in the nursing curriculum where NCD topics can be included.

Nursing Service

- NLWWH can be implemented in the community areas for the welfare of the women in the community thereby to prevent the NCD morbidity rate

Nursing Research

- Similar such studies can be done including the other common NCD among women

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